# HAND-HELD DEVICE FOR PICKING UP OBJECTS

## CROSS-REFERENCE TO RELATED APPLICATIONS

Not applicable.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable.

## INCORPORATION BY REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

Not applicable.

## BACKGROUND OF THE INVENTION

The present invention is in the field of hand-held devices used for gripping or picking up objects. Such devices are often utilized by people having limited mobility. Such devices are also frequently used by anyone who desires to simply increase his or her range for grasping or holding objects.

Hand-operated remote gripping, grappling, and grabbing devices have been around for ages. The array of devices that have been invented to achieve this singular purpose are both numerous and diverse. Indeed, inventions drawn toward achieving this object include everything from the most mundane pair of kitchen tongs all the way to the most elaborate of grapples, seemingly incorporating every manner of mechanical and dexterous advantage for accomplishing highly specialized tasks related to remote manual gripping.

This field is broad and diverse enough that it is possible to categorize prior inventions in a variety of ways. Among the most conventional gripping devices are those that convert some variation of the conventional "trigger" action into some form of gripping or grasping action in a way that often mimics the action and dexterity found in the human opposable thumb and forefinger. Such devices commonly operate at a distance on the order of a few feet, and frequently on a single line of action. Even within this seemingly simple and straightforward class of devices, inventors have employed a great variety of mechanical means for achieving the stated task.

Beyond this mainline class of gripping devices are several others that are distinguishable by virtue of enhancements to articulation or dedication to specific tasks. In the former category are inventions having multiple joints, making the devices adaptable to and operable in situations calling for remote manual gripping in locations where certain known obstacles present difficulties to a single line of action. Other devices in this group have modular or interchangeable actuators. Others provide members for enhancing the stability of the conventional trigger or hand grip user interface. Still others in this category offer the benefit of adjustable length. The latter category of gripping devices, those dedicated to specific tasks, encompasses remote gripping devices designed for dedicated uses such as picking up dead animals, grasping cables, retrieving cans, pulling weeds, extracting light bulbs, grasping worms, gripping shoes, picking up animal waste, and lifting stones.

Both within and without these categories, many remote manual gripping devices have incorporated mechanisms for locking the jaws or other actuators in various positions ranging from fully opened to fully closed. Although the specific geometries differ widely, these mechanisms almost universally employ some variation of a simple ratchet arrangement. Unfortunately, these

devices also universally suffer from one of two maladies. In some devices, the locking mechanism is so delicate as to easily wear out after repeated uses. In other devices, portions of the locking mechanism remain in physical contact with the primary activation mechanisms. These locking mechanisms thus continue to wear even when not in use for locking purposes.

For all of the diversity and innovation that has taken place in this field, many of the devices are simply over-engineered or cumbersome. In addition to the shortcomings found among locking mechanisms, other devices require the use of two hands, some provide little or no mechanical advantage, and many are simply poorly designed for prolonged and repeated use. Thus, there is a need for a simple yet robust remote manual gripping device that can truly stand the test of time.

## BRIEF SUMMARY

The specification discloses a hand-held device for gripping objects positioned beyond arm's length, comprising: At least a first pair of jaws movable relative to each other between at least an unclamped and at least a first clamped position thereof; a handle spaced apart from the at least first pair of jaws by a central portion, the handle including a moveable trigger connected to the at least first pair of jaws, whereby movement of the trigger is operative to selectively position the at least first pair of jaws between the unclamped position and a fully closed position thereof, and a locking mechanism operative to selectively lock the at least first pair of jaws in the at least first clamped position thereof. The locking mechanism comprises a lock lever including a cam surface, the lock lever selectively moveable between a first position, wherein the lock lever is engaged with the trigger to limit movement thereof, and a second position, wherein the lock lever is disengaged from the trigger to permit unlimited movement thereof, and wherein further the lock lever is biased to the first position thereof, and a manually operable switch having a cam

following portion which, by selective movement of the switch, is positionable along the cam surface of the lock lever to effect movement of the lock lever between the first and second positions thereof.

According to a further feature of this invention, a series of notches are provided on one of the lock lever or trigger and a corresponding tab is provided on the other of the lock lever or trigger, wherein the notches and tab cooperate when the lock lever is in the first position.

Per another feature hereof, the trigger and the at least first pair of jaws are connected by a resilient linking member. According to yet another feature of the present invention, the resilient linking member comprises a rod having a spring section provided along the length thereof.

In still another feature hereof, the at least first pair of jaws are selectively rotatable relative to a longitudinal axis of the device defined between the handle and the at least first pair of jaws.

According to a further feature of this invention, the central portion terminates in a seating surface, and the at least first pair of jaws include an opposing end surface which is seatable upon the seating surface of the central portion, and wherein the at least first pair of jaws are rotatable relative to the seating surface of the central portion, and wherein further the seating surface of the central portion and the opposing end surface of the at least first pair of jaws include one or the other of complementary tab and recess portions, the complementary tab and recess portions engageable to define at least a first rotational position of the at least first pair of jaws relative to the longitudinal axis of the device. A plurality of the complementary tab and recess portions are radially spaced about the end surface of the at least first pair of jaws and the seating surface of the central portion to thereby define a plurality of rotational positions of the at least first pair of jaws relative to the longitudinal axis of the device.

Per still a further feature of this invention, each of the at least first pair of jaws includes a gripping portion removably connected thereto. Each gripping portion comprises an upper part having opposite gripping and seating surfaces, and a stem part extending axially from the upper part, the stem part including at least one radially extending tab, and wherein further each of the at least first pair of jaws includes a blind bore dimensioned to receive therein the stem part, including the tab, the bore opening adjacent an upper surface opposing the seating surface of the gripping portion upper part, and the bore further communicating with a radiused slot dimensioned to receive therein the tab of the stem part to thereby permit rotational movement of the gripping portion relative to the jaw.

The seating surface of each gripping portion may include at least one detent, and the upper surface of each of the at least first pair of jaws includes a complementary recess positioned at the limit of rotational movement of the gripping portion relative to the jaw.

According to an even further feature hereof, the trigger includes a stop portion, and the handle includes an opposing surface against which the stop portion abuts to define a limit to the range of motion of the trigger in a first direction. At least a first recess may also be defined below the stop portion, the at least first recessed area dimensioned to accommodate the index finger of a user.

## BRIEF DESCRIPTION OF THE DRAWINGS

The present invention may be better understood with reference to the drawings, of which:

**FIGURE 1** depicts an isometric view of the present invention;

**FIGURE 2** is a partially cutaway side elevational view of the present invention depicting the operation of the trigger and jaws;

**FIGURE 3*a*** depicts a side elevational and partially cutaway view of the gripping assembly;

**FIGURE 3*b*** depicts an isometric and partially exploded view of the gripping assembly;

**FIGURE 3*c*** is an enlarged side elevational cutaway view of the interior of the gripping assembly taken along line 3c of **FIGURE 3*a***;

**FIGURES 4*a* and 4*b*** are side elevational views of the gripping assembly depicting the rotational feature of that assembly;

**FIGURE 5*a*** is an enlarged isometric view of the removable gripping surface of the present invention;

**FIGURE 5*b*** is a side elevational cutaway view of the removable gripping surface of the present invention;

**FIGURES 6*a* and 6*b*** depict the interior of the handle of the present invention in various operational states;

**FIGURE 6*c*** depicts prior art; and

**FIGURE 6*d*** is an enlarged cutaway view of a portion of the locking assembly of the present invention.

## DETAILED DESCRIPTION

Referring now to the drawings, wherein like numerals indicate like or corresponding parts through the several views, the present invention will be seen to comprise most generally at least a first pair of jaws movable relative to each other between an unclamped and at least a first clamped position, a handle spaced apart from the at least first pair of jaws by a central portion, the handle including a movable trigger connected to the at least first pair of jaws, whereby

movement of the trigger is operative to selectively position the at least first pair of jaws between the unclamped position and fully closed position, and a locking mechanism operative to selectively lock the at least first pair of jaws in the at least first clamped position thereof. The locking mechanism comprises a lock lever, including a cam surface, the lock lever selectively movable between a first position, wherein the lock lever is engaged with the trigger to limit movement, and a second position, wherein the lock lever is disengaged from the trigger to permit unlimited movement, and wherein further the lock lever is biased to the first position; and a manually operable switch having a cam following portion which, by selective movement of the switch, is positionable along the cam surface of the lock lever to effect movement of the lock lever between the first and second positions.

As used herein, the term "clamped" refers simply to the condition wherein an object is grasped between the at least first pair of jaws. As such, the term "clamped" is not to be construed to require complete closure of the at least first pair of jaws.

Turning to **FIGURES 1** and **2**, a hand-held device for gripping objects positioned beyond arm's length is described. The hand-held device for gripping objects **10** has three major portions. The first portion is a central portion **12.** A rod **20** is enclosed within and coaxial with central portion **12.** The rod **20** is the primary member in achieving operable connectivity between a handle assembly **70** and a gripping assembly **40.** The gripping assembly **70** is operatively attached to the distal end of the central portion **12.** The connection between the gripping assembly **70** and central portion **12** is further described below. Finally, the handle assembly **40** is connected to the proximal end of portion **12.** The handle assembly **40** and portion **12** may be connected by any conventional means such as epoxies or glues, one or more screws, pins, friction, any of these in combination, or other fasteners known in the art.

Turning now to **FIGURES 3*a*** and **3*b***, a pair of jaws **64** and **66** movable relative to each other between at least an unclamped and at least a first clamped position is disclosed. Gripping assembly **40** features a housing **42** that may be made in two pieces. The housing has a trapezoidally shaped base portion **43** and a neck portion **45.** The base **43** and neck **45** portions of housing **42** may be constructed as one piece or in multiple parts. The neck portion **45** of gripping assembly housing **42** is generally cylindrical in shape. Neck portion **45** should be small enough in exterior diameter to be received within the end of central portion **12**. The neck portion **45** terminates in stop **48**. A hole of sufficient diameter to allow passage of rod **20** is provided in stop **48**. The narrower end of trapezoidally shaped base portion **43** is connected to the neck portion **45**.

The side walls of base portion **43** are cutaway at the corners of its wide end. First pivot post **44** and second pivot post **46** are mounted near these wide end corners of base portion **43**. The first jaw **64** and second jaw **66** are respectively mounted to first and second posts **44** and **46**. Jaws **64** and **66** are each provided with holes adapted to engage pivot posts **44** and **46**. Portions of jaws **64** and **66** extend outwardly away from housing **42** and each terminates in an end effector **68**. It will be appreciated that exterior portions of jaws **64** and **66** may be configured in a variety of ways. The configuration of these portions as depicted throughout the drawing figures are generally suitable for multiple purposes. In this embodiment, jaws **64** and **66** are provided with rubberized grips **65** having abraded surfaces. In addition, end effectors **68** are provided with gripping portions **120**. As will be apparent to those having skill in the art, jaws **64** and **66** and the associated components may be constructed in a variety of ways to accomplish specialized or dedicated tasks.

Portions of jaws **64** and **66** also extend inwardly into housing **42**. These interior portions of jaws **64** and **66** are each reduced more than halfway in thickness and interleaved to achieve an overlapping configuration inside of housing **42**. These interior portions are further provided with slots **62**. Slots **62** of the interleaved jaws **64** and **66** cooperate to define an opening **60**. A carriage assembly **50** is disposed within opening **60**.

As can be seen in reference to **FIGURES 3*b*** and **3*c***, the carriage assembly **50** consists of pull rod end-boss **52**, rack **54**, and lug **56**. End-boss **52** is secured to rod **20** by a recessed set screw or other conventional device known in the art. Rack **54** contains a central recessed portion to accommodate the rod **20** and lug **56**. A rectangular aperture is provided through the center of this recessed portion to accommodate end-boss **52**. Lug **56** may be constructed in one or two pieces. If constructed of one piece, it is disposed entirely through the central portion of rack **54**. If the lug **56** is composed of two pieces, these may be affixed to rack **54** with solder, epoxy, or the like. Lug **56** is also provided with a substantially rectangular aperture to accommodate end boss **52**. The apertures in rack **54** and lug **56**, as well as the recessed portion in rack **54** to accommodate rod **20** should be sized to allow the free rotation of end boss **52** and rod **20** when fully assembled. Lug **56** cooperates with opening **60** to complete the mechanical connection between jaws **64** and **66** and rod **20**.

A second boss **58** is attached to rod **20** at a sufficient distance away from end boss **52** to dispose second boss **58** within neck portion **45** of housing **42**. A helical spring **59** is disposed within neck portion **45** of housing **42** coaxial with rod **12** and abutting boss **58** on one end and stop **48** of housing **42** at its other end. Boss **58** is secured to pull rod **20** by any conventional means as with boss **52**.

Turning now to **FIGURES 4*a*** and **4*b***, the selective rotation of the jaws **64** and **66** relative to a longitudinal axis of the device defined between the handle assembly **70** and jaws **64** and **66** is described. It will be seen that the gripping assembly **40** resides at the distal end of central portion **12**. Specifically, the distal end of central portion **12** receives the neck portion **45** of housing **42** of the gripping assembly **40**. A seating surface **14** is attached to distal end of central portion **12**. The seating surface **14** may be attached to central portion **12** by any conventional means as have already been mentioned, provided that surface **14** is fixed and not free to rotate with respect to central portion **12**. A series of recess portions **16** are provided on the end face of surface **14**. Correspondingly, a series of tabs **18** are provided on the shoulder at the juncture of neck portion **45** and base portion **43** of gripping assembly housing **42**. The arrangement and operation of this interface is further detailed below.

Turning now to **FIGURES 5*a*** and **5*b***, it can be seen that each of jaws **64** and **66** includes a gripping portion **120** removably connected thereto. In this particular embodiment, end effector **68** is substantially hollow and provided with female locking interface portions. Specifically, end effector **68** has a bore **32** with adjoining radiused slots **34**. In addition, the seating surface of end effector **68** is provided with recesses **36**. Gripping portion **120** is provided with the corresponding male interlocking interface portions. These are a stem **122**, tabs **124**, and detents **126**. The mating of gripping portion **120** with end effector **68** is achieved through the insertion of stem **122** of gripping portion **120** into bore **32** of effector **68**. Tabs **124** of gripping portion **120** initially fit the corresponding geometry of bore **32**, however, gripping portion **120** is not fully seated in this orientation. A user would further twist gripping portion **120** in a counterclockwise fashion until tabs **124** fully engage radiused slots **34**, and detents **126** are fully seated in recesses **36**. An

improved mating may be achieved if one or both of the interfacing materials is slightly resilient. It will also be appreciated that end effectors **68** and gripping portions **120** may be made in a variety of shapes and sizes, and it is not necessary that the working surfaces of gripping portions **120** correspond in shape or size to end effectors **68**. Thus, a variety of removable portions with specialized or dedicated working surfaces may be alternatively engaged with the mating surface provided by end effectors **68**.

Turning at last to **FIGURES 6*a*** to **6*d***, the figures show the handle assembly **70** including a moveable trigger **80** connected to jaws **64** and **66**, whereby movement of trigger **80** is operative to selectively position jaws **64** and **66** between the unclamped position and fully closed position thereof, and a locking mechanism operative to selectively lock jaws **64** and **66** in a first clamped position thereof. Handle assembly **70** is provided with housing **72** which connects to the proximal end of central portion **12**. As described above, the housing **72** may be attached to the central portion **12** by any means known in the art. The housing is generally made from two mirrored mating halves. Housing **72** provides a trigger pivot shaft **74**, a lock arm pivot shaft **76**, and a cam shaft mounting hole **78**. Also prominent on housing **72** is hand grip **90**.

Trigger **80** is pivotally mounted to trigger pivot shaft **74** of housing **72**. Trigger **80** is further connected by way of a rod connector **84** to rod **20**. The forward range of motion of trigger **80** is limited by a forward stop portion **82** which abuts against an opposing surface of housing **72**. The portion of the trigger **80** interior to housing **72** is substantially hollow to accommodate the pull rod connector, locking tab **86**, and lock lever **100**, which requires free movement within the hollow portion of trigger **80**. The aft range of motion of trigger **80** is limited in one mode by the interface of trigger-mounted tab **86** with the most rearward of the trigger

interface notches **106** on lock lever **100**. Alternatively, in a second mode, the aft range of motion of trigger **80** is limited by the hand grip **90**.

Provided below the stop portion **82** is at least a first recess dimensioned to accomodate the index finger of a user. As will be appreciated from **FIGURES 6*a*** and **6*b***, this recess, in combination with the stop portion **82**, serves to prevent a user's index finger, or any part thereof, from being caught or pinched between the trigger **80** and the housing **72**.

It will further be appreciated that the stop portion **82**, by increasing the area of the trigger **80**, serves to strengthen the trigger by reducing the amount of force per given area applied thereto when the trigger is operated.

The locking mechanism of the hand-held gripping device features lock lever **100** which is mounted on lock arm pivot shaft **76** of housing **72**. The proximal end of lock lever **100** is attached by way of spring **108** to housing **72**. The distal end of lock lever **100** interfaces with cam roller **110** and its associated assembly. The distal end of lock lever **100** features a variable geometry interface consisting of a first cam seat **102**, a second cam seat **104**, and a cam seat divider **103**. Interfacing with this geometry is cam follower **110**, which is attached by way of cam arm **114** to lateral camshaft **112**. Cam follower **110** is preferably, though not necessarily, rotatably disposed on the cam arm **114**, by which arrangement less wear of the cam follower **110** results and, moreover, the cam follower **110** is more easily moved between the at least first **102** and second **104** cam seats. Lateral camshaft **112** is pivotally mounted to housing **72** by way of the camshaft mounting hole **78**. At least one end of the lateral camshaft is exposed to the exterior of housing **72**. Toggle arm **116** is connected to the exposed end of lateral camshaft **112** by any means.

The present invention is used in one of two primary modes. The first mode could be considered a conventional gripping mode where the locking mechanism is in the disengaged position. The second mode could be considered a grip-lock mode wherein the device is operated with the locking mechanism in an engaged position. The modes are switched by use of the toggle arm **116**. The motion of the toggle arm **116** effects a rotation of the lateral camshaft **112** resulting in a displacement of cam arm **114** and cam follower **110**. The particular geometry of the first and second cam seats **102** and **104** on lock lever **100** along with the intervening cam seat divider **103** provides for an essentially binary positional arrangement of cam follower **110** with respect to lock lever **100**. The cam follower **110** is disposed to rest in either the first cam seat **102** or the second cam seat **104**. The cam seat divider **103** creates an instability in its interface with cam follower **110** and thus urges the follower to rest in either seat **102** or seat **104**. Since the cam follower **110** may only be toggled between these two positions, the toggle arm **116** is similarly disposed to have only two positions. The toggle arm **116** thus behaves as a switch that results in one of two predetermined positions for lock lever **100** with respect to trigger tab **86**. When cam follower **110** is at rest in first cam seat **102**, the trigger interface notches **106** of lock lever **100** are displaced away from tab **86** on trigger **80** by virtue of the pivotal restriction on lock lever **100** provided by the lock lever pivot shaft **76** on housing **72**. When the user toggles cam follower **110** to the second cam seat **104**, spring **108** serves to draw the proximal end of lock lever **100** and the associated trigger interface notches **106** to a position where those notches will come into contact with trigger tab **86** if the trigger **80** is displaced a sufficient distance.

In the first mode, the user first operates toggle arm **116** to its forward position, displacing cam follower **110** to first cam seat **102**. The user then grasps the present invention by fitting the

hand grip **90** and trigger **80** into the palm and fingers of his hand. When the user flexes his fingers to draw the trigger **80** toward hand grip **90**, trigger **80** pivots freely on trigger pivot shaft **74** and the rod connecting pin **84** serves to transmit the displacement of the trigger to the rod **20**. Returning now to **FIGURES 3*a*** and **3*b***, when the pull rod **20** is drawn toward the proximal end of the device, the rod end boss **52** serves to displace carriage assembly **50**. As the carriage assembly **50** traverses in linear fashion in the proximal direction of the device, the lug **56** of carriage assembly **50** traverses the interleaved slots **62** of jaws **64** and **66**. This displacement of the interior portions of jaws **64** and **66** is further restricted by pivot posts **44** and **46**, thus effecting a rotation of jaws **64** and **66** around respective pivot posts **44** and **46**. Jaws **64** and **66** are thus drawn toward each other.

The displacement of rod **20** similarly displaces second boss **58**. This boss serves to compress spring **59** between itself and stop **48** in the neck portion **45** of housing **42**. Thus, the user must pull the trigger with sufficient force to overcome the opposing force created by the compression of spring **59** between boss **58** and stop **48**. When the user relaxes his grip on trigger **80**, the residual force in spring **59** serves to displace boss **58**, and thereby rod **20**, in a distal direction. The displacement of the rod **20** caused by spring **59** is limited by the positive stop **82** provided on trigger **80** when the stop **82** abuts the housing **72** of the handle assembly **70**. Thus, when the device is at rest, the jaws **64** and **66** are biased toward an open orientation, and the trigger is biased to its foremost position. In this first mode of operation, the user's displacement of trigger **80** therefore achieves a proportional displacement of jaws **64** and **66**. The user is thus able to achieve an extension of his gripping ability to the distance provided by the length of the central portion **12**.

The second mode of operation for the device is achieved when the cam follower **110** is moved to rest in the second cam seat **104** by way of toggle arm **116**. In this mode, when the user grips and displaces trigger **80**, tab **86** on the trigger contacts a first tooth **105** in advance of the first trigger interface notch **106**. The slightly rounded geometry of the tooth **105** allows the tab **86** to urge lock lever **100** underneath tab **86**, and tab **86** eventually seats itself in the first trigger interface notch **106** due to the urging of spring **108** on lock lever **100**. The forward travel of the trigger **80** and rod **20** thus becomes limited by the restraint of notches **106** on lock lever **100** against tab **86**. In this mode, the jaws are unable to return to a fully open state and the device achieves the static maintenance of a partially closed position. It will be appreciated that the number and location of trigger interface notches **106** may be varied to achieve a corresponding variety of partially closed positions of jaws **64** and **66**. In the pictured embodiment, the notch **106** nearest to spring end of lock lever **100** corresponds to a fully closed position for jaws **64** and **66**.

As can be seen in reference to **FIGURE 2**, one embodiment of the present invention incorporates resilient portion **22** into rod **20**. In the embodiment shown, the resilient portion **22** substantially resembles a helical tension spring. In the second mode of operation, wherein lock lever **100** is disposed to engage trigger tab **86**, resilient portion **22** of rod **20** serves to provide a latent gripping force to jaws **64** and **66** when the user operates trigger **80** to the partially and fully closed positions. If, for instance, the user desires to grasp an object of a dimension narrower than that provided between pads **120** when jaws **64** and **66** are in a partially closed position, but wider than the distance between pads **120** when the jaws are in a fully closed position, the user would be unable to achieve a locking grip on an object so dimensioned with a device having a substantially inelastic rod **20**. In the present embodiment, however, the user can achieve a locking

grip on an object of the above-described dimensions due to the presence of resilient portion **22** in rod **20**. When jaws **64** and **66** have fully contacted the object in question and are limited by that object from achieving a closer proximity, the user may continue to exert a force on trigger **80** and further displace it by effecting an elastic tensioning of the resilient portion **22**. The user is thus able to displace tab **86** on trigger **80** to the next available trigger interface notch **106** on lock lever **100**. When the trigger **80** is thus locked, resilient portion **22** continues to exert a tensile force within rod **20** allowing jaws **64** and **66** to maintain positive compression forces on the object in question. The user may release the grip achieved by the device simply by operating toggle arm **116** to move cam follower **110** from second cam seat **104** to the first cam seat **102**. In this way, tab **86** on trigger **80** is freed from the restriction of trigger interface notches **106** on lock lever **100** and the jaws **64** and **66**, rod **20**, and trigger **80** are restored to the fully opened condition through the restorative force provided by spring **59** acting against stop **48** and boss **58**.

Returning to **FIGURES 4*a*** and **4*b***, it will be appreciated that in one embodiment of the present invention the user may change the orientation of gripping assembly **40** with respect to central portion **12** and handle assembly **70**. To achieve this result, the user simply draws the gripping assembly **40** away from central portion **12** and seating surface **14** as indicated by the arrow in **FIGURE 4*b***. The gripping assembly **40** is then free to rotate with respect to portion **12** and surface **14** to any one of a number of predetermined positions. More particularly, the rack **54** and lug **56**, which both have fixed orientations in relation to the gripping assembly, are free to rotate relative to end-boss **52**, which itself is fixed to the pull rod **20**. When the user releases gripping assembly **40**, the residual compression forces in spring **59** between boss **58** and stop **48** serve to urge gripping assembly **40** against surface **14**. The recess portions **16** in surface **14** and

the tabs **18** on grasping assembly housing **42** serve to further secure the seating of gripping assembly **40** against seating surface **14**. This feature thus provides the user with an additional degree of dexterity in using the device.

A variety of materials may be used in constructing present invention. Except where otherwise indicated in this disclosure, the materials used for the pieces in the present embodiments are generally of a substantially rigid nature. Whether these materials be hardened plastic polymers or any of various substantially non-malleable metals is a matter of design choice and cost effectiveness.

While the invention has been described in connection with what is presently considered to be the most practical and preferred embodiments, the invention is not limited to those disclosed embodiments. To the contrary, the applicant intends that this disclosure cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is intended to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.